New York, 5, 6, 8, 10, 11, 13, 18, 25, 26. North Carolina, 3, 9, 10, 12, 17, 25, 26, 28, 29, 30. North Dakota, 13, 14, 18, 19, 20. Ohio, 5, 6, 8, 9, 10, 16, 18, 23 to 26. Oklahoma, 1, 4. Oregon, 4, 9, 17. Pennsylvania, 5, 6, 8, 9, 10, 16, 18, 25, 26. Rhode Island, 10, 16. South Carolina, 2, 12, 16, 28, 30. South Dakota, 4, 15, 19, 20, 28. Tennessee, 8, 9, 10, 14, 15, 28. Texas, 1, 26 to 29. Utah, 5, 16, 19, 23. Vermont, 10 to 13, 22. Virginia, 5, 8, 9, 10, 12, 14, 17, 19, 25, 26, 28. Washington, 2 to 5, 8, 13, 14, 17. West Virginia, 4, 6, 9, 10, 19, 25, 26, 29. Wisconsin, 18, 20, 21.

WIND.

PREVAILING DIRECTIONS.

The prevailing winds for January, 1895, viz, those that were recorded most frequently at Weather Bureau stations, are shown in Tables I and IX; they are not given on Chart II, as has hitherto been the custom, but the resultant winds are published instead.

HIGH WINDS.

Maximum wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows (maximum velocities are averages for five minutes; extreme velocities are gusts of shorter duration, and are not given in this table):

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
		Miles				*Miles*	
Amarillo, Tex.	5	50	sw.	Fort Canby, Wash.	20	52	e.
Do	20	76	w.	Grand Haven, Mich.	21	50	sw.
Block Island, R. I.	10	53	ne.	Hannibal, Mo.	21	50	w.
Do	26	56	se.	Idaho Falls, Idaho	16	52	s.
Buffalo, N. Y.	26	64	w.	Kittyhawk, N. C.	25	52	se.
Do	27	59	w.	Do	26	56	se.
Cairo, Ill.	25	52	sw.	Do	28	50	n.
Chicago, Ill.	21	64	sw.	Lexington, Ky.	26	60	sw.
Do	25	60	nw.	Milwaukee, Wis.	21	50	sw.
Cleveland, Ohio	13	54	sw.	Port Huron, Mich.	21	53	sw.
Davenport, Iowa	21	54	sw.	Pueblo, Colo.	17	50	sw.
Eastport, Me.	26	66	se.	St. Louis, Mo	21	56	sw.
Fort Canby, Wash.	2	58	e.	Tatoosh Island, Wash.	2	66	e.
Do	3	56	e.	Do	3	73	e.
Do	4	53	e.	Do	12	54	s.
Do	9	52	s.	Do	13	50	w.
Do	10	52	se.	Do	15	52	e.
Do	11	53	se.	Do	16	50	e.
Do	12	77	se.	Winnemucca, Nev.	4	60	s.
Do	13	54	se.	Woods Holl, Mass	13	50	sw.
Do	15	50	e.	Do	26	54	sw.
Do	16	58	e.				

LOCAL STORMS.

Destructive or severe local storms were reported as follows:

3d.—Seattle, Wash., snowstorm.

5th.—Salt Lake City, Utah, windstorm.

6th.—Little Rock, Ark., thunderstorm.

7th.—Nunnelly, Tenn., and Greendale, Ky., thunderstorms.

8th.—Kershaw, S. C., thunderstorm.

13th.—Near Fulton, Mo., windstorm.

16th.—Mobile, Ala., thunderstorm; several persons injured.

17th.—Oakland, Cal., windstorm.

18th.—Northwestern part of Daviess County, Mo., windstorm.

19th.—Los Angeles, Cal., rainstorm.

20th.—Kiowa, Kans., windstorm.

21st.—New Iberia, La., windstorm; 1 person injured. Eglantine and near Pocahontas, Ark., windstorms. Winslow, Ark., thunderstorm. Near Greenway, Ark., thunderstorm; 13 persons injured. Covington, Tenn., and Unionville, Mo., thunderstorms. Nelson, Mo., and Benton Harbor and Muskegon, Mich., windstorms.

24th.—Livingston, Tex., windstorm.

25th.—Crowley, La., windstorm; 1 person killed. Western part of Vermilion County, La., windstorm; 2 persons killed. Rayne, La., windstorm. Kountze, Tex., windstorm; 2 persons injured. Near Beaumont, Texas City, Olive, and Dodge, Tex., and Olney, Ill., windstorms.

28th.—Magnolia, Miss., windstorm; several persons injured. Alvin, Tex., windstorm. Galveston, Lamarque, Webster, and Clear Creek, Tex., thunderstorms. Dickinson, Tex., thunderstorm; 4 persons injured.

ATMOSPHERIC ELECTRICITY.

GENERAL STATISTICS.

The statistics relative to auroras and thunderstorms for this month are given in detail in Table XI, which shows the number of stations from which meteorologic reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month.

THUNDERSTORMS.

A mention of the more severe thunderstorms reported during the month is made under "Local storms." The dates on which reports of thunderstorms were most numerous were: 6th, 7th, 16th, 20th, 21st.

The States where thunderstorm reports were most numerous were: Louisiana, Ohio, Missouri, Illinois, Mississippi, Florida, Iowa, and North Carolina.

The States where the dates of thunderstorms were most frequent were: Louisiana, where they were recorded on 15 days; Florida, on 14 days; Ohio, on 9 days; Mississippi, on 8 days; North Carolina and Arkansas, on 7 days.

AURORAS.

The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four days preceding and following the date of full moon, viz, from the 6th to the 14th, inclusive. On the remaining twenty-two days of this month 122 reports were received, or an average of 6 per day. The dates on which the reported number especially exceeded this average were: 1st, 18; 16th, 15; 19th, 16.

The States from which auroras were reported by a large percentage of observers were: Vermont, North Dakota, New Hampshire, and Minnesota.

The States where the dates of auroras were most numerous were: Wisconsin, 11; Minnesota, 10; Colorado, 8; Nevada, North Dakota, and Vermont, 5.

CANADIAN DATA—THUNDERSTORMS AND AURORAS.

Auroras were reported as follows: 1st, Kingston, Ont.; 2d, Medicine Hat, Assin., and Prince Albert, Sask.; 15th, Medicine Hat, Assin.; 17th, Father Point and Quebec, Que.; White River, Ont., and Minnedosa, Man.; 18th, Father Point, Que., and Qu'Appelle, Assin.; 19th, St. Andrews, N. B., Quebec, Que., Kingston, Ont., Minnedosa, Man., and Medicine Hat, Assin.; 20th, Father Point, Que., and Medicine Hat,

Assin.; 21st, Swift Current, Assin., and Battleford, Sask.; 22d, Qu'Appelle, Assin., and Battleford, Sask.; 23d, Minnedosa, Man., and Medicine Hat, Assin.; 24th, Minnedosa, Man., Medicine Hat, Assin., and Prince Albert, Sask.; 27th, Kingston, Ont.; 29th and 30th, Minnedosa, Man.; 31st, Quebec, Que., and Minnedosa, Man.

METEOROLOGY AND MAGNETISM.

The movements of our atmosphere are to be studied primarily as problems in the mechanics and thermodynamics of moving gases and vapors, but our knowledge of the empirical relations between atmospheric phenomena and terrestrial magnetism has been elucidated by a few special students, and further study in this direction has been recognized by the Chief of the Weather Bureau as proper and desirable. As the subject of atmospheric electricity, including that of auroras and earth currents, has a small section in this REVIEW, Professor Bigelow contributes the following section on terrestrial magnetism.

THE COMPARISON OF TEMPERATURE WITH MAGNETIC HORIZONTAL FORCE.

By Prof. F. H. BIGELOW.

The columns headed Calgary, Williston, and Sioux City give for each day, respectively, the mean of the 8 a. m. and 8 p. m. observations of temperature at the following groups of stations:

Calgary for Minnedosa, Qu'Appelle, Prince Albert, Swift Current, Medicine Hat, Battleford, Edmonton, Calgary.

Williston for Valentine, Yankton, Huron, Pierre, Moorhead, Bismarck, Williston.

Sioux City for Springfield, Mo., Kansas City, Wichita, Concordia, Omaha, Sioux City.

The average temperature for each group is reduced back to the origin, W. 115°, N. 55°, by a correction for eastward drift (see Amer. Jour. Sci., Dec., 1894). The first differences of these numbers are taken; then the monthly mean of the first differences for slope; then the variations on the slope; then these latter are added successively throughout the month and the accumulated sums give the ordinates of the curve for each group; the mean of these three groups is taken and gives the curve in the upper part of Chart V; the monthly mean of the ordinates is added with reverse sign to reduce to a true datum line. Thus, the eastward drift and the slope have been eliminated, and the variations reduced to a zero base line.

The magnetic data are treated in the same way as the temperatures. The curve as plotted is the mean of the ordinates of the three stations. It has been found that at least five magnetic observations are required to eliminate local conditions and to give a true value of the external impressed field, though seven are better. By inspecting the columns it will be seen that local variations disturb the curves in certain cases. Hence, as the data now exist, the comparison can give only partially accurate curves as to detail, though the main features may be expected to appear.

SPECIAL FEATURES OF THE JANUARY CURVES.

The temperatures of the Calgary group need the correction +1 for slope; the others are uncorrected. San Antonio is reduced for amplitude by the factor $\frac{1}{2}$; the others are unchanged. The mean temperatures are reduced to a zero datum line by +1, and the mean magnetic force by +23.

The new magnetic ephemeris, with the epoch June 13.72, 1887, went into effect on January 1, 1895 (see Am. Met. Jour., Jan., 1895). This is a change from June 12.22 for the epoch of the 26.68 day period, to conform to the position of the solar axis of the magnetic curve. The new period, therefore, begins on January 17.44. No magnetic disturbances were reported in January, 1895.

STATE WEATHER SERVICES.

The following extracts are given in regard to the general weather conditions experienced in the several States and Territories as reported by State Weather Service Directors:

Alabama.—January, which on an average is the coldest month of the year in this State, has been a typically wintry month, with many changes from daily normals for temperature and an excess of about 2 inches in rainfall. Three distinct cold waves passed over the State; one, on the 13th, brought very low temperatures all over the State, and high westerly winds prevailed on the 12th, 13th, 15th, and 26th.

Arizona.—The average temperature for the Territory, as deduced from the records of 36 stations, was 43.2°, or about 5° above the normal. The average precipitation, as deduced from the records of 44 stations, was 2.49 inches, which is about 1.50 inches above the normal.

Arkansas.—The monthly mean temperature for the current month was 3.3° below the normal. There were three distinct periods of abnormally low daily mean temperatures, viz, 1st to 4th, inclusive, about 8° per day below the normal; 12th to 14th, 15° below the normal, and 26th to end of month, 16° below the normal. The warm periods were 5th to 7th, 14° per day above the normal, and the highest temperature for the month was recorded at many stations; 18th to 23d, about 10°.

California.—The deficiency in temperature has caused no damage from frost, nor has the excessive precipitation done any material damage, excepting the flooding of some valuable lands along the Sacramento River, which will be planted to crops later on in the season.

Colorado.—The average temperature for the State was about 2° above the January normal. The fall of snow was most general on the 15th and 31st.

Florida.—The mean temperature for the month was about 2.2° lower than the mean for January, 1894.

Georgia.—The month opened with very cold weather prevailing, and on the 13th the State was again visited by a cold wave of marked severity, causing the mercury to fall to near zero at points in the northern districts, and far below the freezing point in the most southerly counties. The average temperature of the month, as a whole, however, varied but little from the normal. In the most northerly counties snow fell at quite a number of stations on the morning of the 12th, and again on the 28th and 30th, in the extreme northern sections only.

Idaho.—Snow fell over the greater portion of the State from the 8th to 13th and from the 16th to 23d. The cold periods were on the 7th and 8th and from the 25th to 31st. The monthly mean temperature for the State was 1.7° below that of January of last year.

Illinois.—The month was cold and stormy; snowstorms, with high winds, following each other in quick succession, and the intervals between storms were marked by sudden and severe cold waves. The month, although severe, was not greatly below the normal temperature, and was by no means the most severe on record. Five periods of severe cold are distinctly noted, viz, 4–5th, 8–9th, 11–14th, 23d–24th, 27th–31st. But one period of warmth is worthy of special mention, that of the week from the 15th to the evening of the 21st, although in southern counties the 6th and 7th were marked by high temperatures, in many cases the highest of the month.

The snow covering the State was generally sufficient to afford light protection to winter grain until the warm weather of the 18–20th, when it practically disappeared. Though the ground was exposed to the cold wave of the 23d–24th, a good mantle of snow again afforded protection from the very severe weather of the 27th to 31st. It is thought that grain has thus far escaped material injury.

Indiana.—The month was a cold one; the temperature was above the normal only 9 days, uninterruptedly so from the 15th to the 21st. The average temperature for the State was 2.9° below the January normal, and a deficiency in average temperature is noted in all portions of the State.

The heavy snowfall on the night of the 11th, during exceedingly low temperature and high west and northwest winds, was found to be